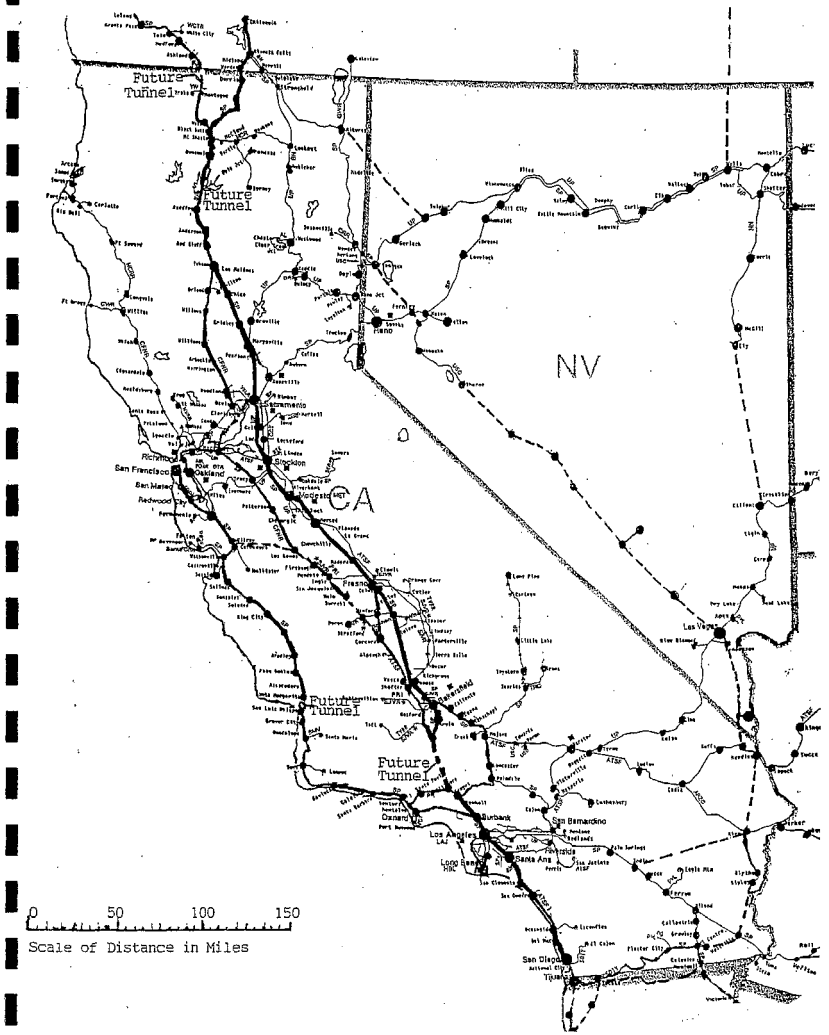
**Comment Letter PH-F031B Continued**

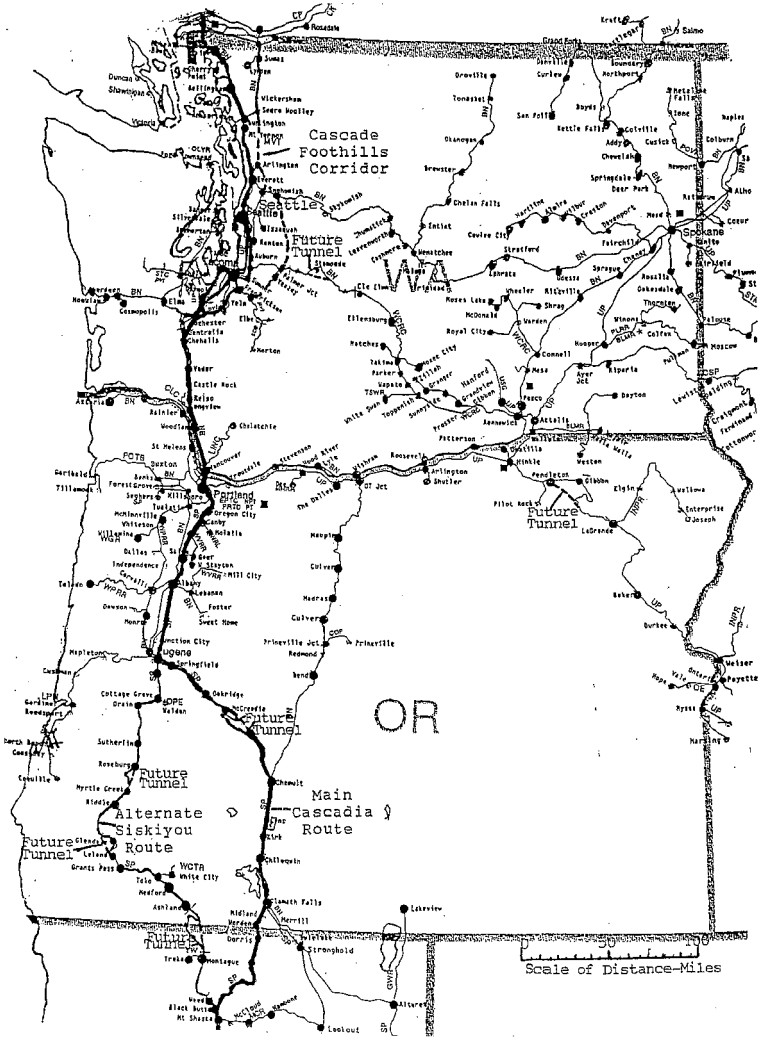
68

PROPOSED ROUTING OF THE HIGH SPEED RAIL CORRIDOR NETWORK IN CALIFORNIA




69

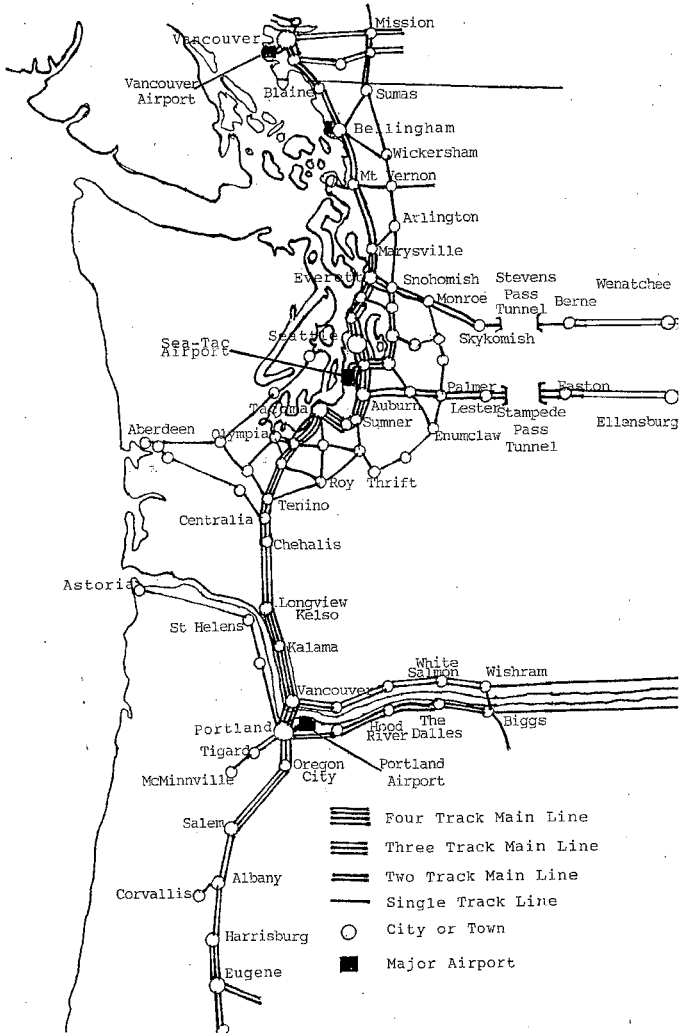
PROPOSED HIGH SPEED RAIL TRANSPORT CORRIDOR IN OREGON AND WASHINGTON



**Comment Letter PH-F031B Continued**

70

TRACK CONFIGURATION REQUIREMENTS FOR THE PACIFIC NORTHWEST RAIL CORRIDOR.

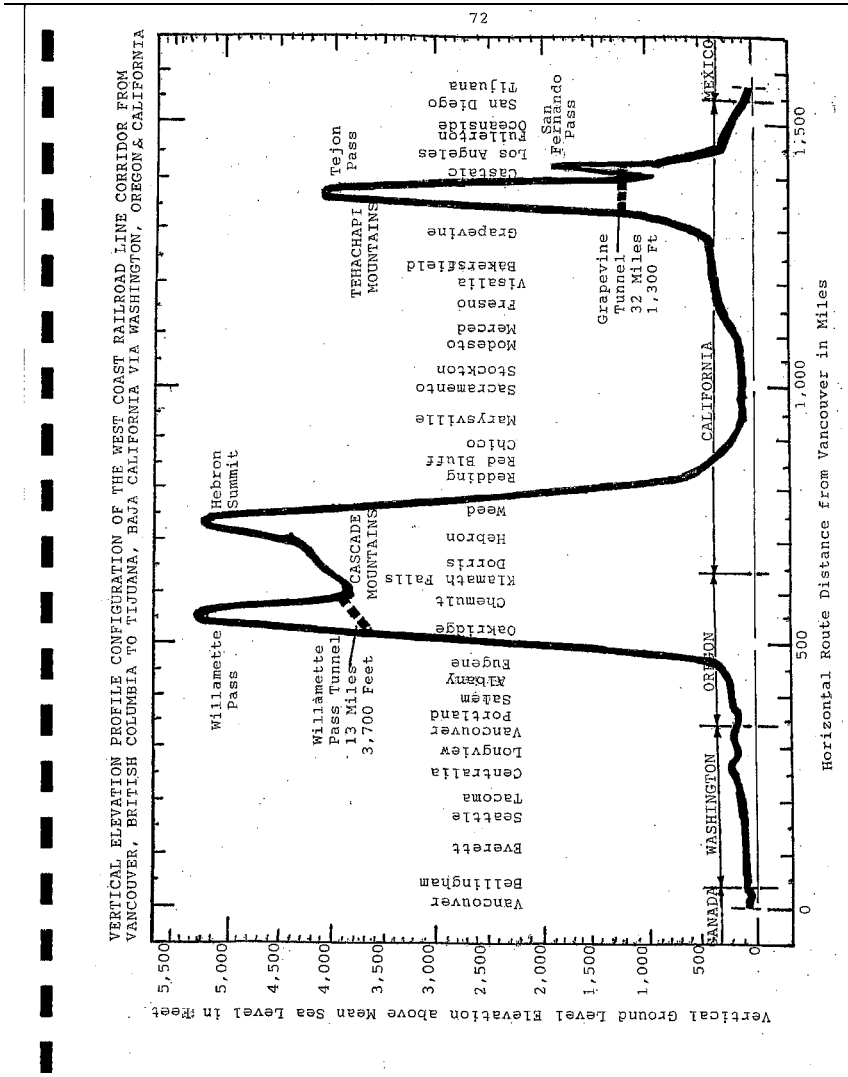


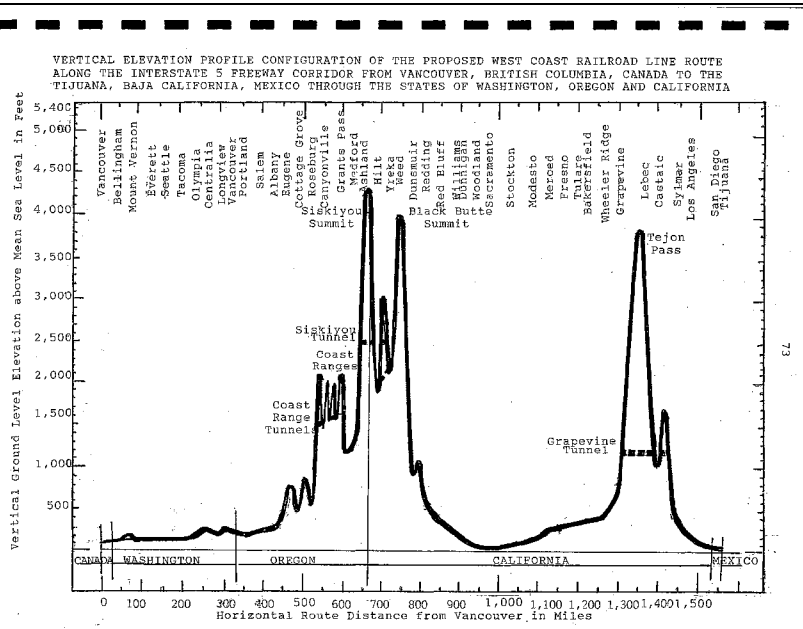

71

WEST COAST RAILROAD

ELEVATION PROFILES

**Comment Letter PH-F031B Continued**



**Comment Letter PH-F031B Continued**

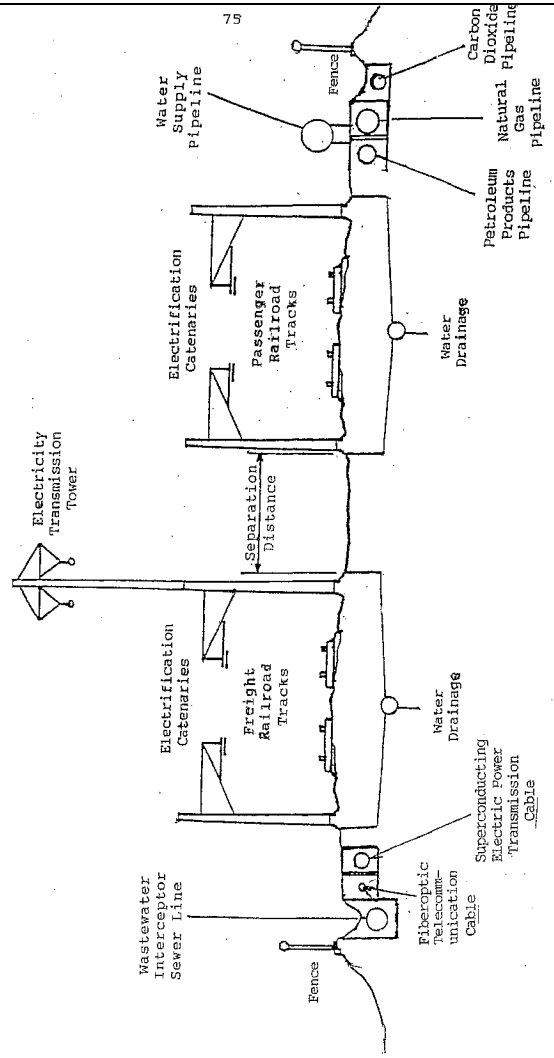
74

WEST COAST RAILROAD

CROSS SECTION PROFILES

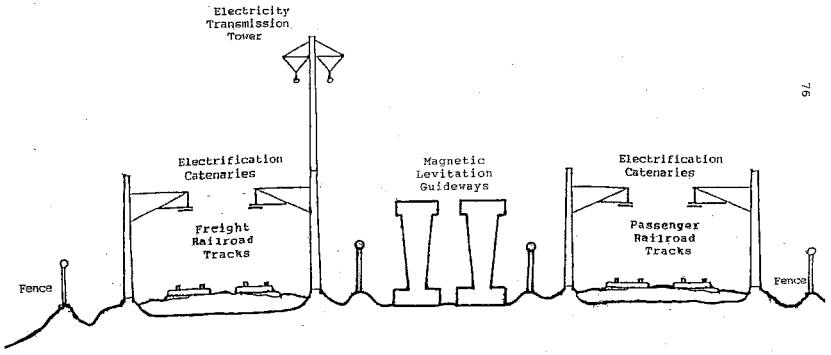
75

CROSS-SECTIONAL VERTICAL PROFILE OF THE COMBINED HIGH SPEED PASSENGER AND FREIGHT RAILROAD LINE ALONG THE INTERSTATE 5 CORRIDOR BETWEEN THE STATES OF WASHINGTON, OREGON AND CALIFORNIA



**Comment Letter PH-F031B Continued**

VERTICAL CROSS SECTIONAL PROFILE OF THE INTEGRATED HIGH SPEED PASSENGER AND FREIGHT RAIL LINE CORRIDOR ALONG THE WEST COAST IN PARALLEL TO THE INTERSTATE 5 FREEWAY IN THE STATES OF WASHINGTON, OREGON AND CALIFORNIA FROM VANCOUVER, BRITISH COLUMBIA TO TIJUANA, MEXICO




76

77

WEST COAST RAILROAD

INFRASTRUCTURE PROJECTS

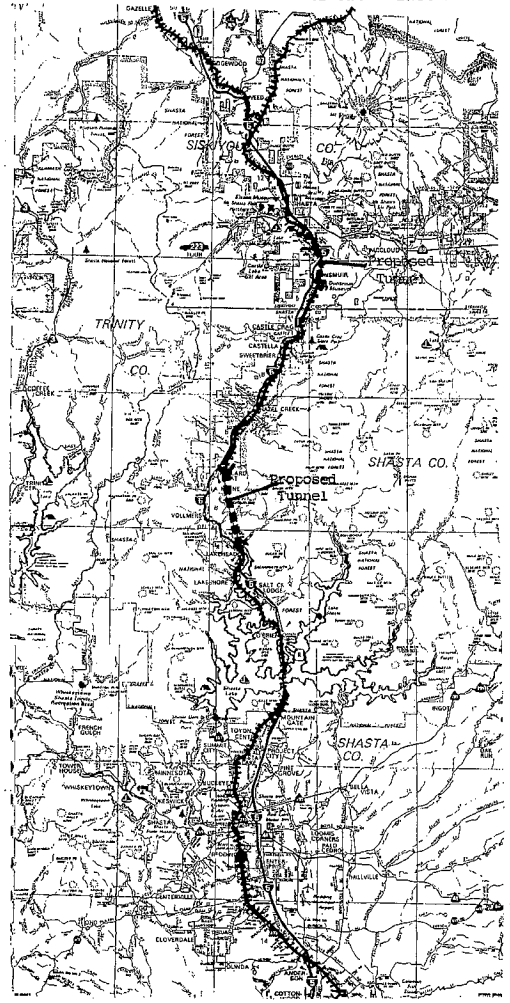
## Comment Letter PH-F031B Continued

**SUMMARY FEATURES OF THE STEPWISE PHASED IMPLEMENTATION PLAN FOR INCREMENTAL IMPROVEMENTS IN THE WESTERN & EASTERN WASHINGTON INTERCITY CORRIDORS TO ALLEVIATE THE RUNWAY CAPACITY CONSTRAINTS AT SEA-TAC AIRPORT**

| Time Frame | Western Washington Corridor Portland-Seattle-Vancouver | Eastern Washington Corridor Seattle-Spokane & Eastern Washington | Northern California Corridor Southern California Corridor |
|---|---|---|---|
| 1996-2000 | Buy 4 New Trainsets for Service<br>Build Tukwila Station for Sea-Tac Airport<br>Construct Prairie Line Bypass Line<br>Start Bellevue-Tukwila Line<br>Upgrade Bellevue-Tukwila Line<br>Make Signal & Track Improvements<br>Start Nonstop Train Service from Seattle to Portland via Tukwila<br>Start Bellevue-Portland Service | Start up Stampede Pass Line for Freight<br>Start Sea-Tac Passenger Service for Wenatchee<br>Start up Stampede Pass Line for Passengers<br>Make signal & track improvements on Line<br>Start Yakima River Canyon Line<br>Start construction of Ellensburg-Lind Line<br>Start double-tracking of Lind-Spokane Line<br>Start Seattle-Ellensburge-Yakima Service<br>Start Sea-Tac Airport Rail Connector Construction | Start second Coast Starlight Train via Klamath Falls<br>Begin second Track Construction in Willamette Valley<br>Upgrade Existing Trackage from Bend to Klamath Falls<br>Begin Upgrading of Siskiyou Line from Eugene to Ashland<br>Add second track to Roseville-Redding Main Line<br>Upgrade Existing Coast Line from San Jose to Glendale |
| 2000-2005 | Buy 4 Additional Trainsets<br>Upgrade Bellevue-Tukwila Line<br>Construct Olympia Connector Line<br>Make Signal & Track Improvements<br>Start Upgrade Bellevue-Snohomish Line for Vancouver Service<br>Start Third Main Track on Seattle to Portland Corridor Line<br>Start Double Tracking of Seattle to Vancouver Corridor Line<br>Start Bellevue Main Terminal<br>Nonstop Seattle-Vancouver Service | Complete construction of Ellensburg-Lind Line<br>Complete construction of Stevens Pass Improvement<br>Start construction of Stampede Pass new Tunnel<br>Upgrade signals for Auburn-Lind-Spokane Line<br>Double-track Stampede Pass access lines<br>Start construction of Renton-Maple Valley Bypass Line<br>Complete construction of Lind-Pasco-Moses Lake Line<br>Complete renovation of Stevens Pass Line<br>Start Seattle-Yakima-Pasco Rail Line Service<br>Complete Sea-Tac Airport Rail Connector Construction<br>Begin Improvements to Idaho and Montana Rail Line | Upgrade Willamette Pass Line Eugene to Chemult<br>Upgrade and Rebuild Sacramento Canyon Line<br>Add second track to Klamath Falls-Weed Line<br>Begin Construction of Siskiyou Mountain Tunnel<br>Begin Construction of Tehachapi Mountain Tunnel<br>Add second track through San Joaquin Valley Line |
| 2005-2010 | Buy 4 Additional Trainsets<br>Construct Lake Samish Bypass Line<br>Rebuild Eastside Rail Line<br>Start Sea-Tac Airport Connector<br>Complete Third Main Track from Seattle to Portland Corridor<br>Complete Double Tracking of the Seattle to Vancouver Corridor<br>Expand Track and Signal Upgrading<br>Expand Nonstop Train Services<br>Start Eastside Railroad Tunnel | Add second main track to Ellensburg & Lind<br>Add second Main Track to Moses Lake-Lind-Pasco Line<br>Start direct rail service from Sea-Tac Airport to Moses Lake Airport and Spokane Airport<br>Complete construction of Stampede Pass Tunnel<br>Start rail passenger service to Pullman<br>Extend rail passenger service to Coeur d'Alene, Sandpoint, Bonners Ferry and Whitefish<br>Continue improvements to Idaho and Montana Rail Line<br>Complete construction of Renton-Maple Valley Bypass Line | Complete Reconstruction of Siskiyou Line Route<br>Complete Construction of Sacramento Canyon Line<br>Complete Construction of Siskiyou Mountain Tunnel<br>Complete Construction of Tehachapi Mountain Tunnel<br>Complete Reconstruction of the Coast Line Route |
| 2010-2020 | Full High Speed Rail Operation<br>150 miles/hour for Passenger Service<br>90 miles/hour for Freight Service | Increase to Full High Speed Rail Operation<br>185 miles/hour for Passenger Service<br>90 miles/hour for Freight Service | Increase to Full High Speed Rail Operation<br>180 miles/hour for Passenger Service<br>90 miles/hour for Freight Service |

78

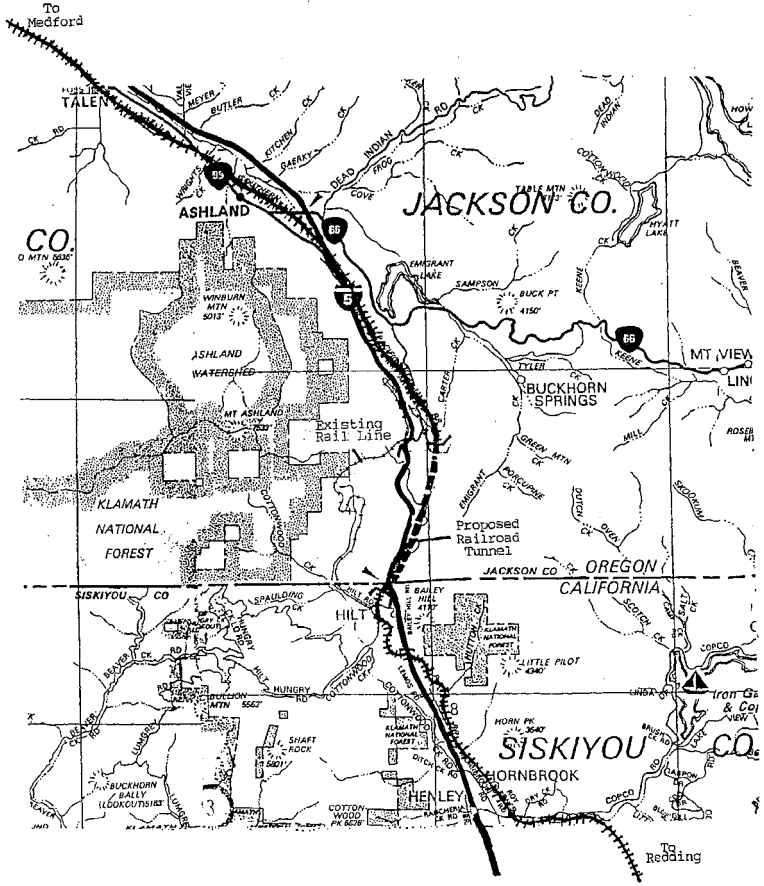
PROPOSED RAILROAD LINE ROUTING THROUGH THE SACRAMENTO RIVER CANYON



**Comment Letter PH-F031B Continued**

80

LOCATION OF THE PROPOSED RAILROAD TUNNEL THROUGH THE SISKIYOU MOUNTAINS.

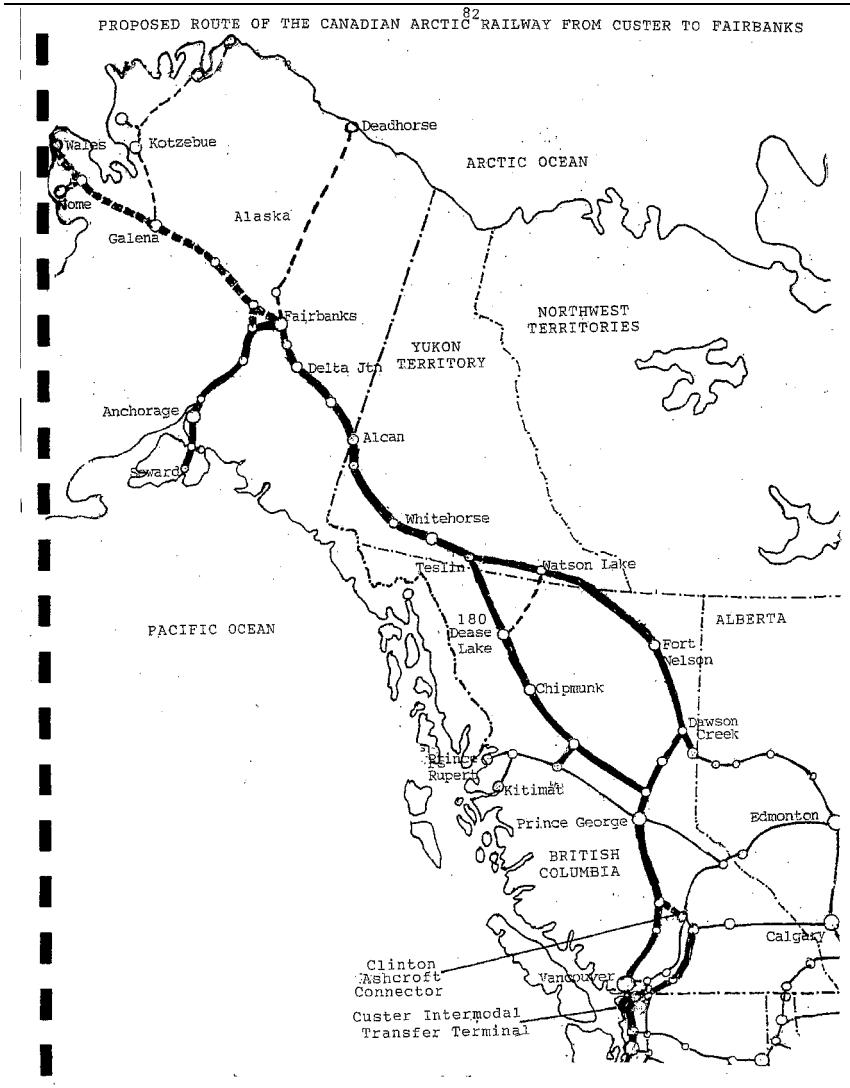


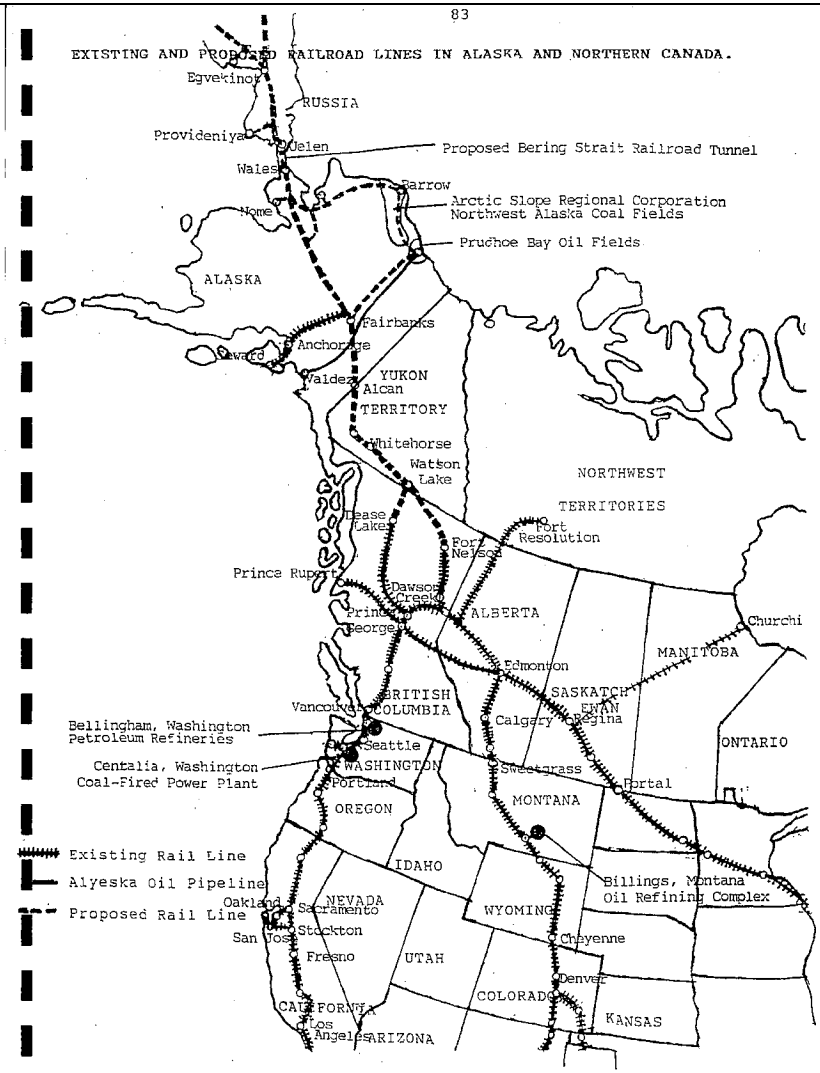

81

ALASKA CANADA

RAILROAD EXTENSIONS

**Comment Letter PH-F031B Continued**



## Response to Comments Hal B. H. Cooper, Jr. , Oral Presentation, Attachment B, April 28, 2004 (Letter PH-F031B)

**PH-F031B-1**

This is an attachment to comment PH-F013. Please see response to Comment PH-F013-1.

## Comment Letter PH-F031C

**PH-F031C**
**Attachment C to Oral Presentation by Hal B. H. Cooper, Jr. 4/28/04 Public Hearing**

THE POSSIBLE ROLE

of the

TEHACHAPI MOUNTAIN RAILROAD TUNNEL

in the

CALIFORNIA HIGH SPEED RAIL PASSENGER PROJECT

Presented to

Mr. Daniel S. Leavitt, Director
State of California Intercity
High Speed Rail Commission
Post Office Box 942874
Mail Stop No. M.S.-74
Sacramento, California 94274

Prepared by

Hal B. H. Cooper, Jr.
Consulting Engineer
Cooper Consulting Company
11715 N.E. 145th Street
Kirkland, Washington 98034

May 2, 1997



Overall Summary

The State of California is planning to construct a high speed rail passenger system of approximately 750 miles in length at a total estimated cost of $22 billion which will be be designed to carry up to 60,000 passengers per day. The State of California has recently established the California High Speed Rail Authority which will be conducting a series of public meetings in attempting to gain public support for the project. The next meeting of the Authority will be on January 21-22, 1998 in Los Angeles.

This high speed rail project now is planned to carry only passengers with a system having train speeds of up to 220 miles per hour. There are some opportunities for the parallel transport of freight to enhance the overall project economic viability. One of these parallel locations is the so-called Castaic Corridor between Bakersfield and Los Angeles of 120 miles through the Tehachapi Mountains. The other parallel route is the so-called Colton Corridor between Los Angeles and San Bernardino of 60 miles in the San Gabriel Valley. These projects are both eligible for separate funding.

Castaic Corridor

It is proposed to construct a double track electrified railroad tunnel through the Tehachapi Mountains between Grapevine and Castaic of 32 miles in length at an elevation of 1,300 feet. This new railroad tunnel would be designed to carry up to 100 passengers trains per day with up to 50,000 people. The tunnel has 140 freight trains per day carrying up to 20,000 truck trailers and other cargo of as much as 850,000 tons per day as its maximum carrying capacity. The total capital cost of the railroad tunnel and the supporter tracks, signals, electrification and support infrastructure is approximately $4.5 to 5.0 billion with a construction time of 5 to 6 years.

The proposed railroad tunnel would shorten the rail haul distance from Los Angeles to Bakersfield from 180 miles to 120 miles as well as eliminate a major capacity bottleneck at the Tehachapi Loop to the east of Bakersfield. It is the most important single link in the California high speed rail project. It is proposed to have a privately financed railroad tunnel with shuttle truck trailer haul service from Bakersfield to Los Angeles and high speed rail passenger service through the tunnel. This tunnel would make it possible for high speed intermodal trailer and container service to be instituted between Los Angeles and Seattle.

Colton Corridor

It is proposed to reconfigure the existing Union Pacific Railroad main line over the 60 mile distance from Los Angeles to San Bernardino so that it can handle both high speed passenger trains and high speed freight trains through the San Gabriel Valley. The line presently handles well in excess of 100 freight trains per day plus 16 to 30 commuter trains and 8 to 10 intercity passenger trains. There are at present two basically parallel railroad lines where one would become a freight line and one a passenger line. An additional factor is that there are at least 60 rail-road grade crossings along the route.

## Comment Letter PH-F031C Continued



The total estimated capital cost of this project is approximately $3.5 to 4.0 billion for the Union pacific Railroad lines and an upgrading cost of $1.0 to 1.5 billion for the parallel Burlington Northern Santa Fe Railroad line as the Corona corridor. The total capital cost of both routes is $4.5 to 5.0 billion with all of the required improvements completed. It is proposed to have this project built with private financing with repayment through the mechanism of service fees on the freight and a ticket tax on the passengers. There would also be a public sector repayment by means of a tax because of the large number of grade separations to be constructed at a 40 to 45 percent contribution to the total capital cost of the project.

The Colton Corridor is basically an extension of the Alameda Corridor project now being constructed between the ports of Long Beach and Los Angeles and downtown Los Angeles. The Alameda Corridor is being constructed at a total cost of $2.2 billion over a 22 mile route distance with 31 grade separations with port bonds, a Federal loan and other public sector contributions. The repayment of the recourse financing is on the basis of a charge on the containers and bulk cargo passing through the ports and over the railroad lines. The Colton Corridor is needed in addition to the Alameda Corridor because otherwise the point of port traffic congestion at present will only be shifted to downtown Los Angeles unlsess the trains can quickly reach the main rail yards ay Colton and San Bernardino at the eastern end of the Los Angeles Basin.

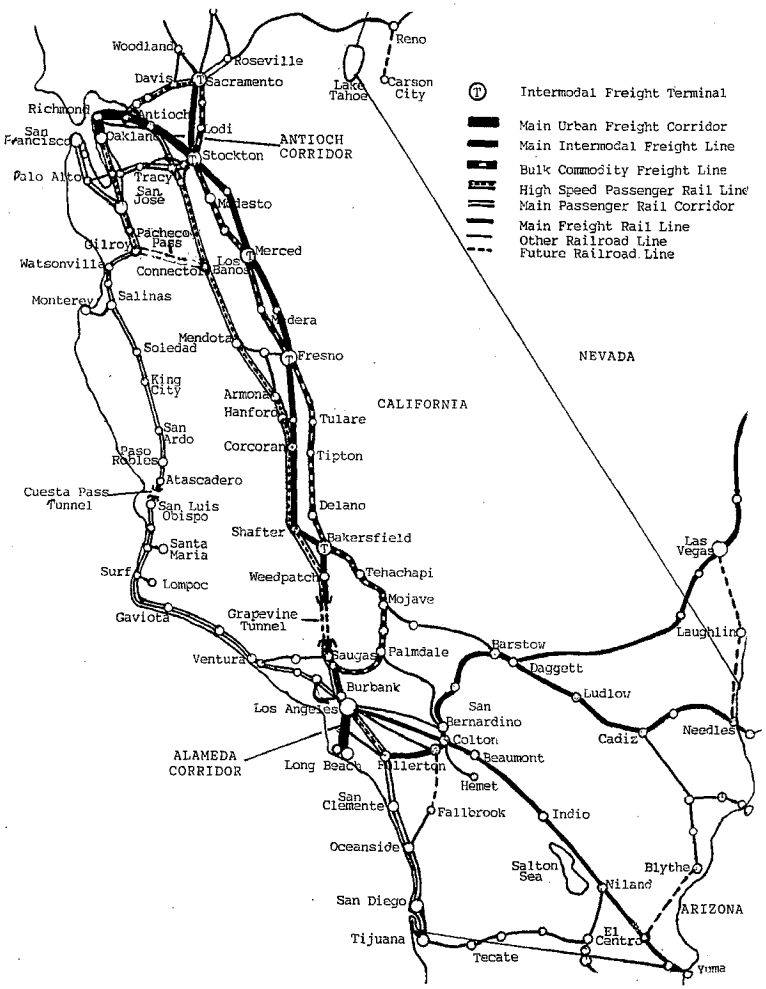
Ensenada Corridor

It is proposed to construct a railroad line network in the northern part of the State of Baja California Norte and southeastern California of approximately 350 to 400 miles in length. This railroad network will be constructed to enhance economic development in northern Mexico and to improve transportation infrastructure in the region. It is also planned to construct a new steel mill, a new cement plant and other industries to supply the contsruction materials for the California high speed rail project. It is also planned to construct a new coal-fired power plant in the Ensenada region to supply the growing electricity needs of the region plus at least some of the California high speed rail.

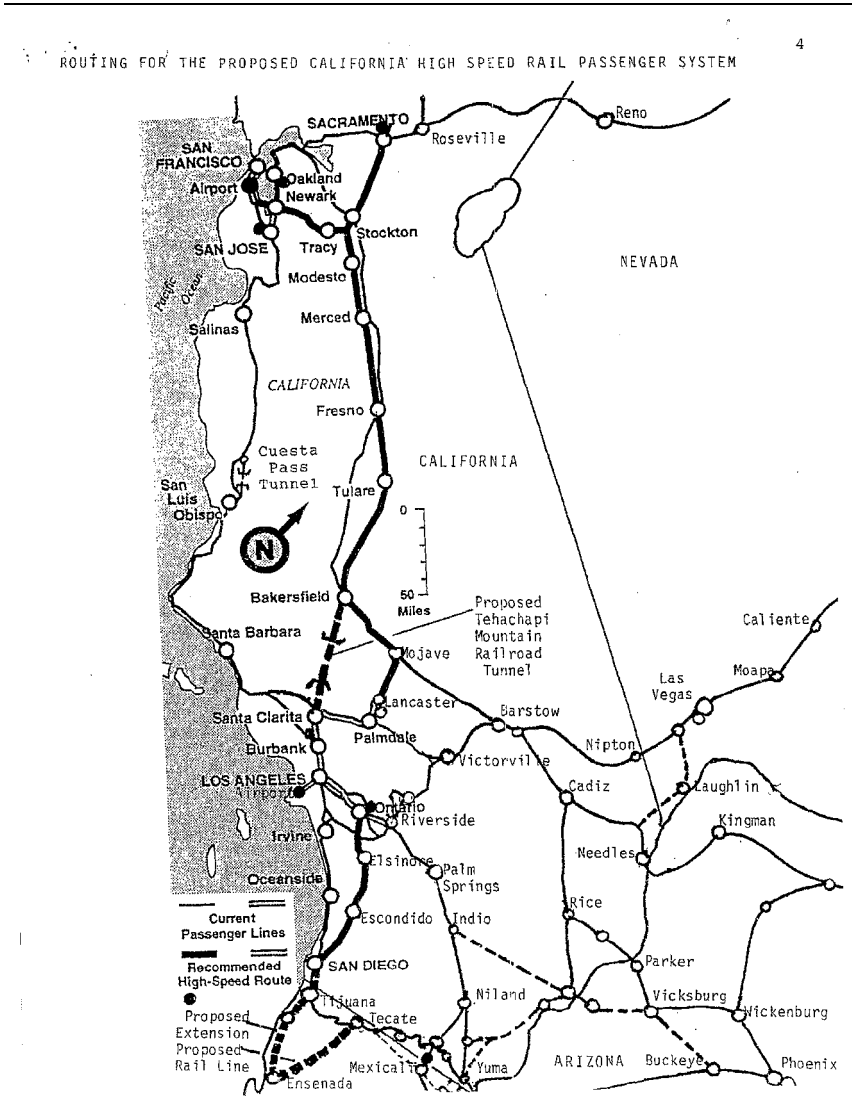
The estimated total capital cost of the railroad project is between $1.5 and 2.0 billion. The primary means of repayment is from the additional freight traffic revenues. It is also desired to have the Port of Ensenada become a major containerized cargo and bulk cargo handling port in northwest Mexico and to expand the capacity of the Port of San Diego at the same time at a cost of $0.5 to 1.0 billion. In addition, the estimated cost of the new steel mill, cement plant, power plant and fertilizer plant in Mexico will be in the range of $3.5 to 4.5 billion. The estimated total capital cost of all of the projects together is between $5.5 and 7.5 billion.

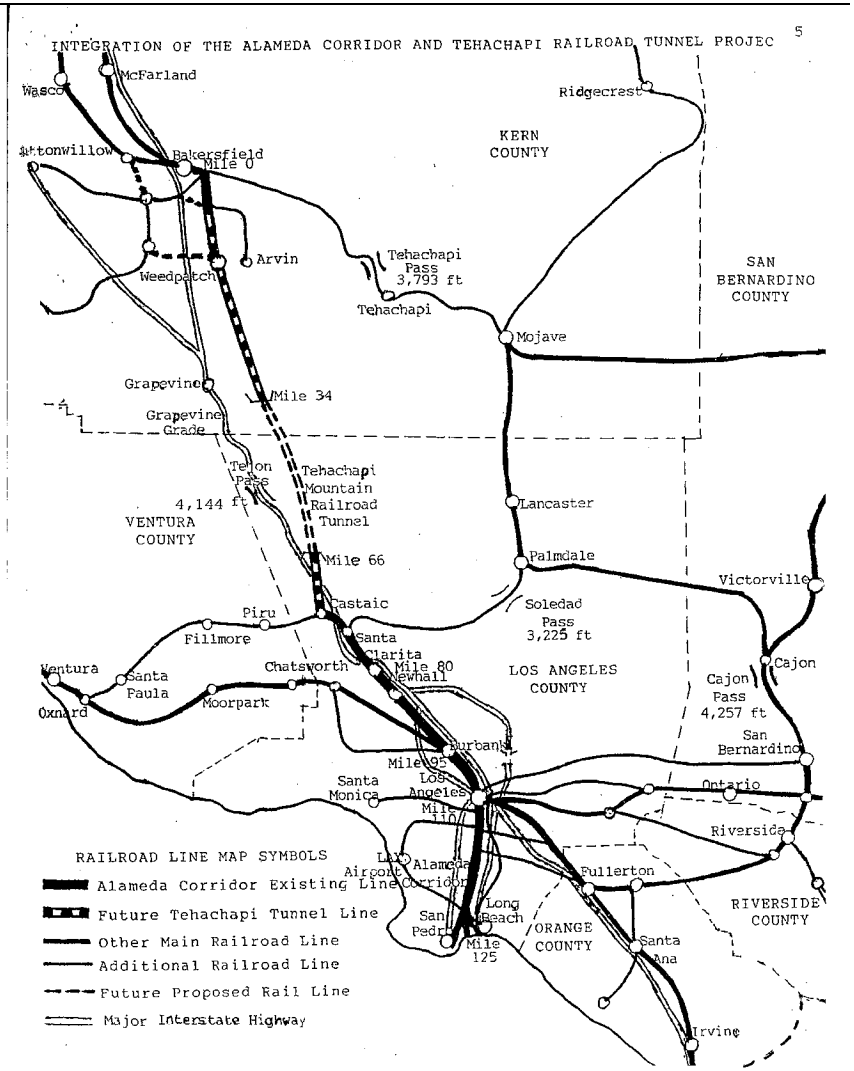


LOCATION OF INTERMODAL FREIGHT TERMINALS IN THE SAN JOAQUIN VALLEY.

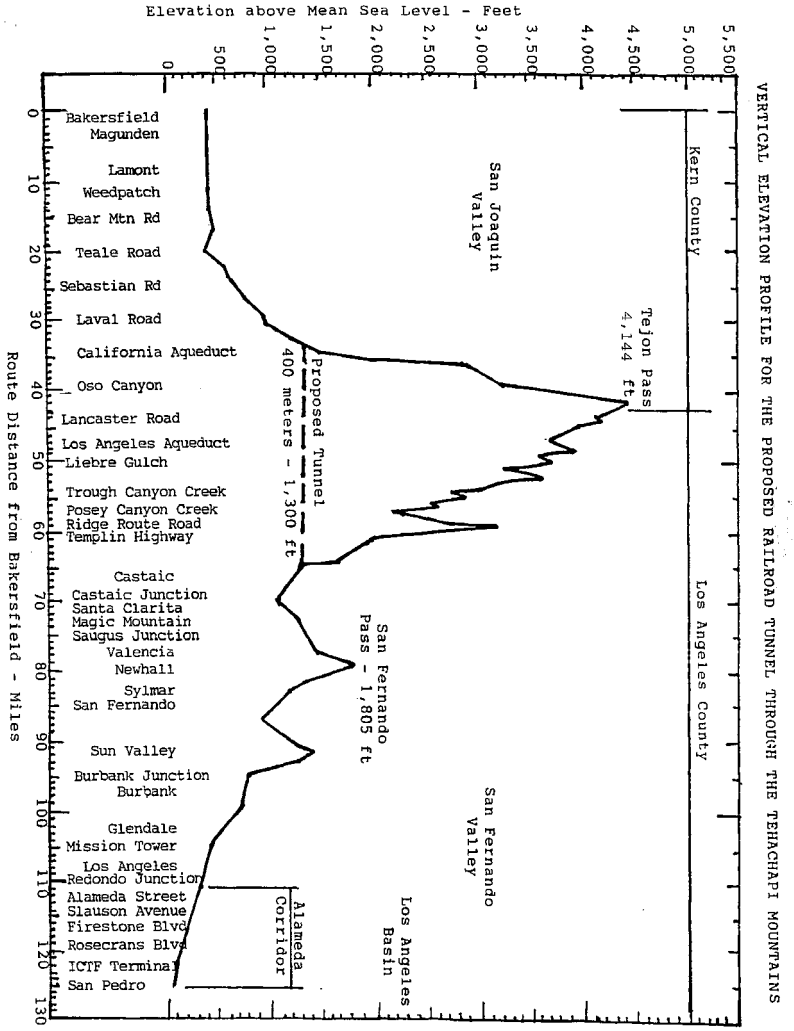


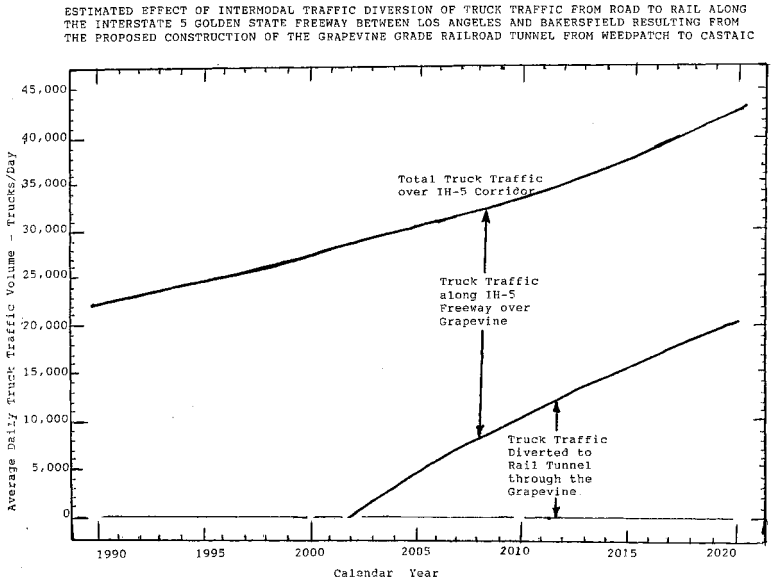
**Comment Letter PH-F031C Continued**



## Comment Letter PH-F031C Continued



**Comment Letter PH-F031C Continued**

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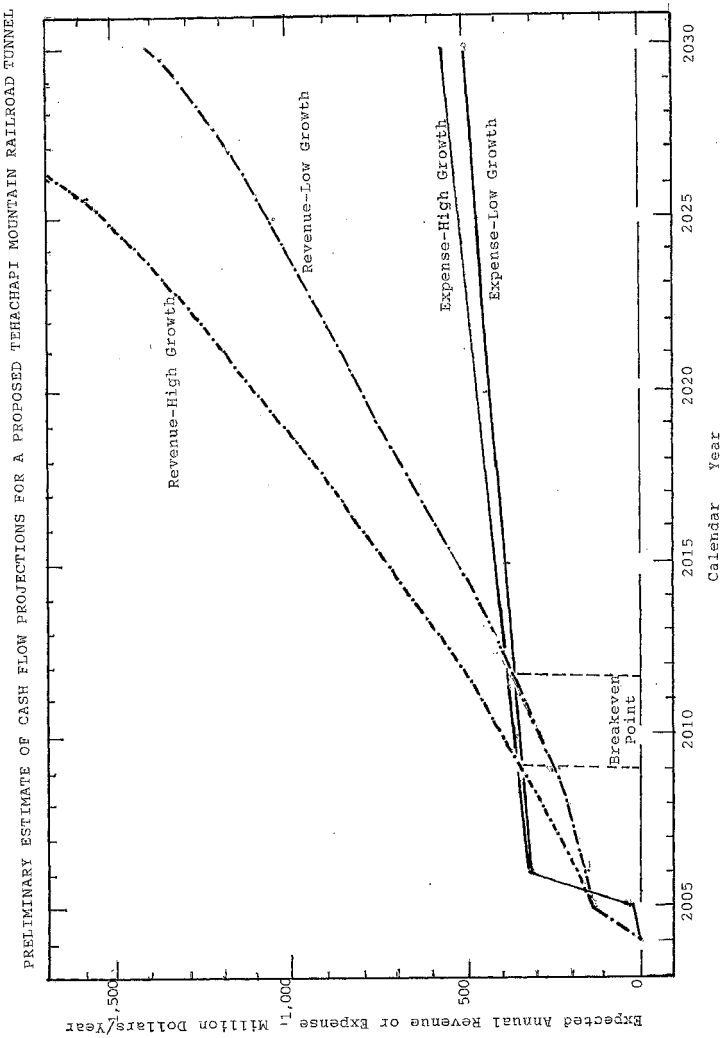
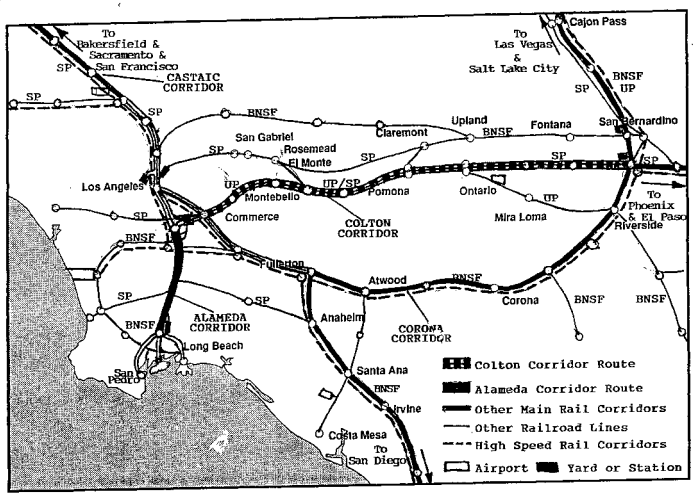
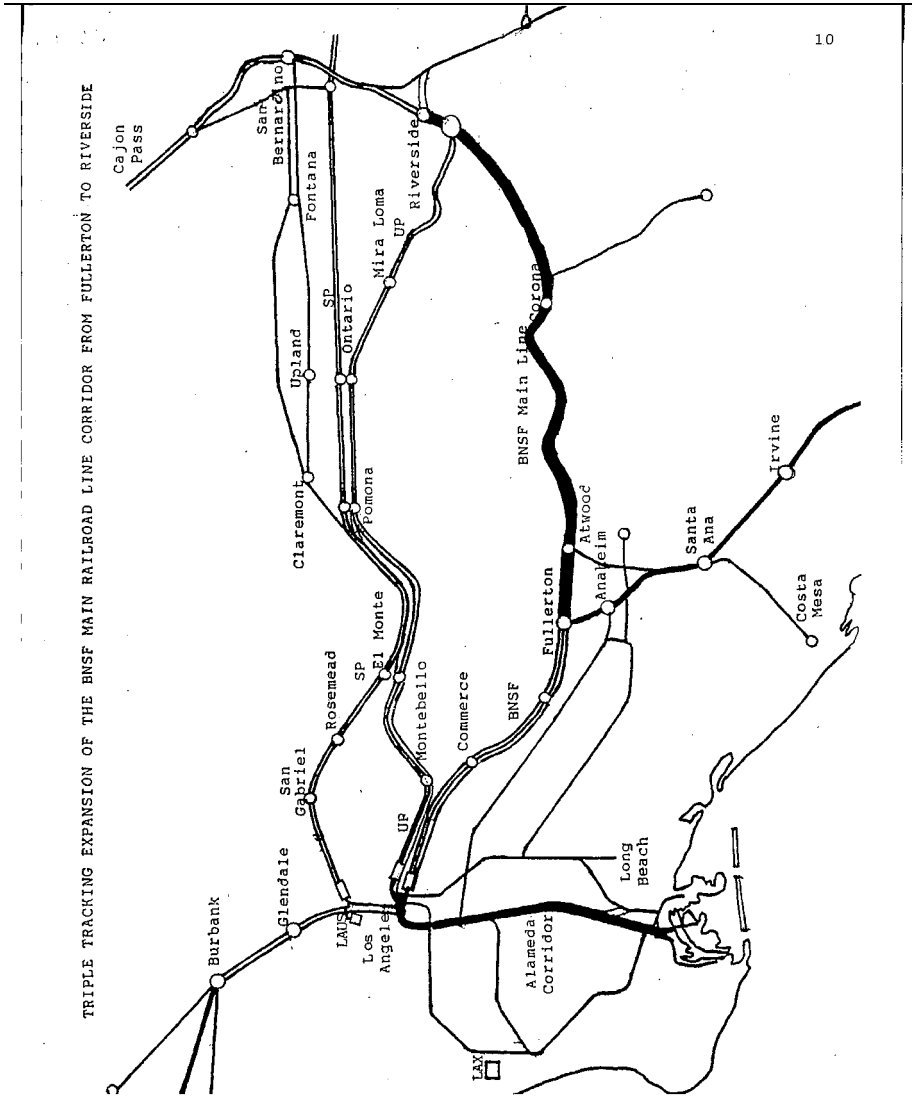
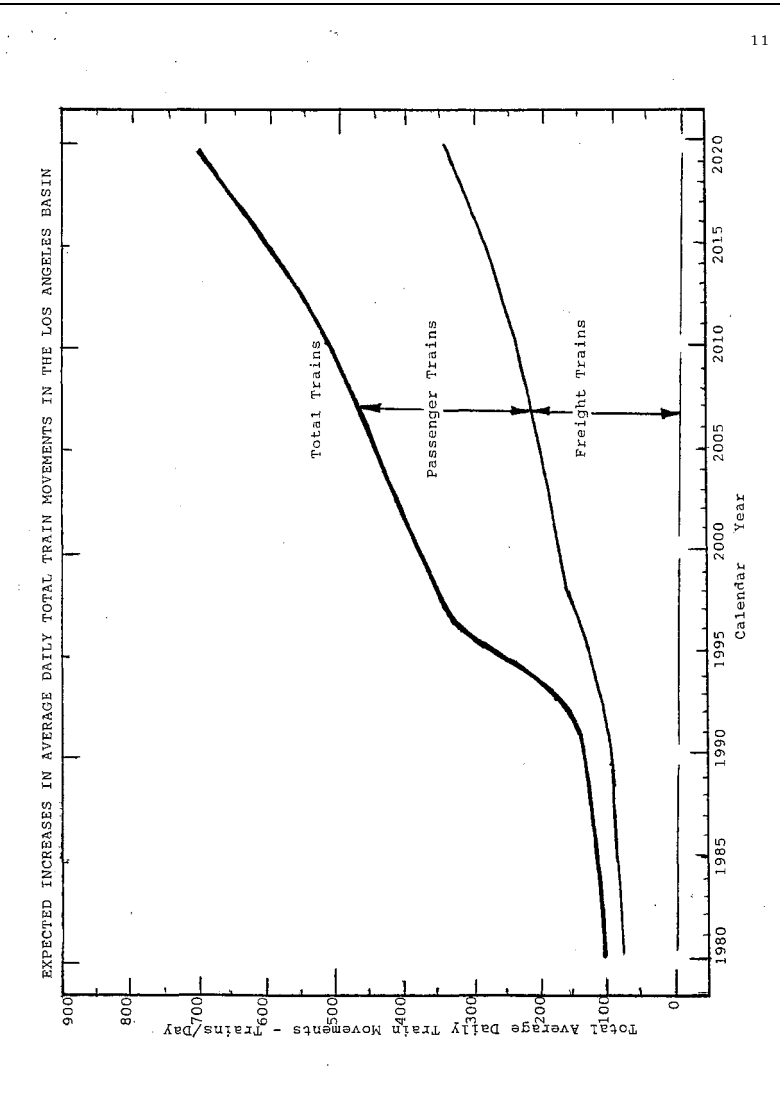



PRESENT AND FUTURE FREIGHT AND PASSENGER RAILROAD LINE CORRIDORS IN THE LOS ANGELES BASIN.



**Comment Letter PH-F031C Continued**

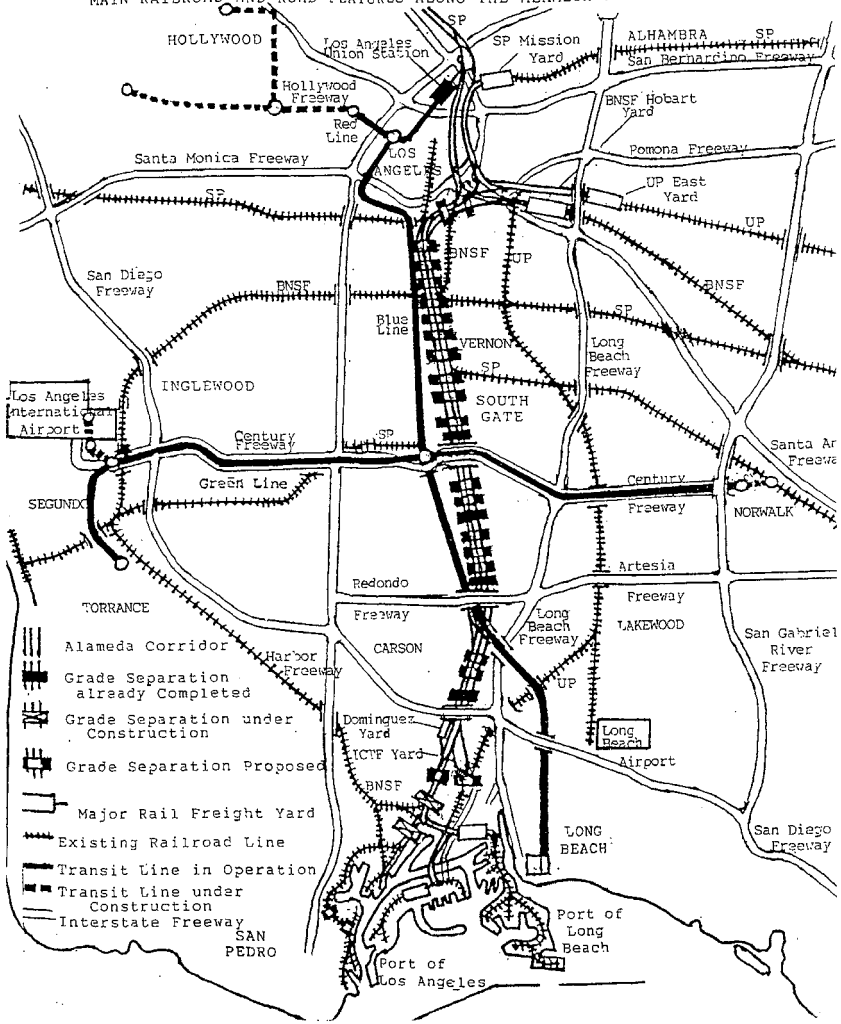


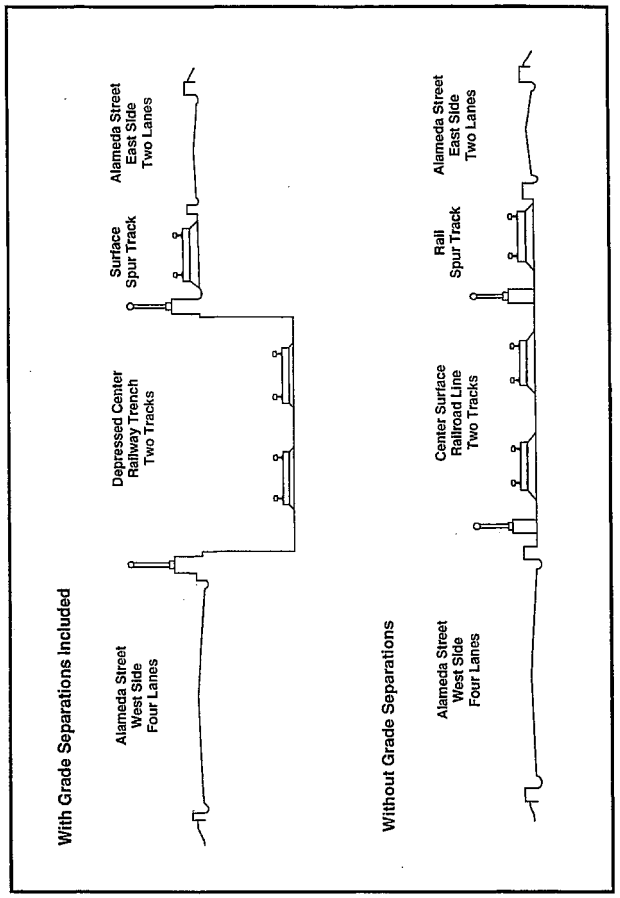
**Comment Letter PH-F031C Continued**

12

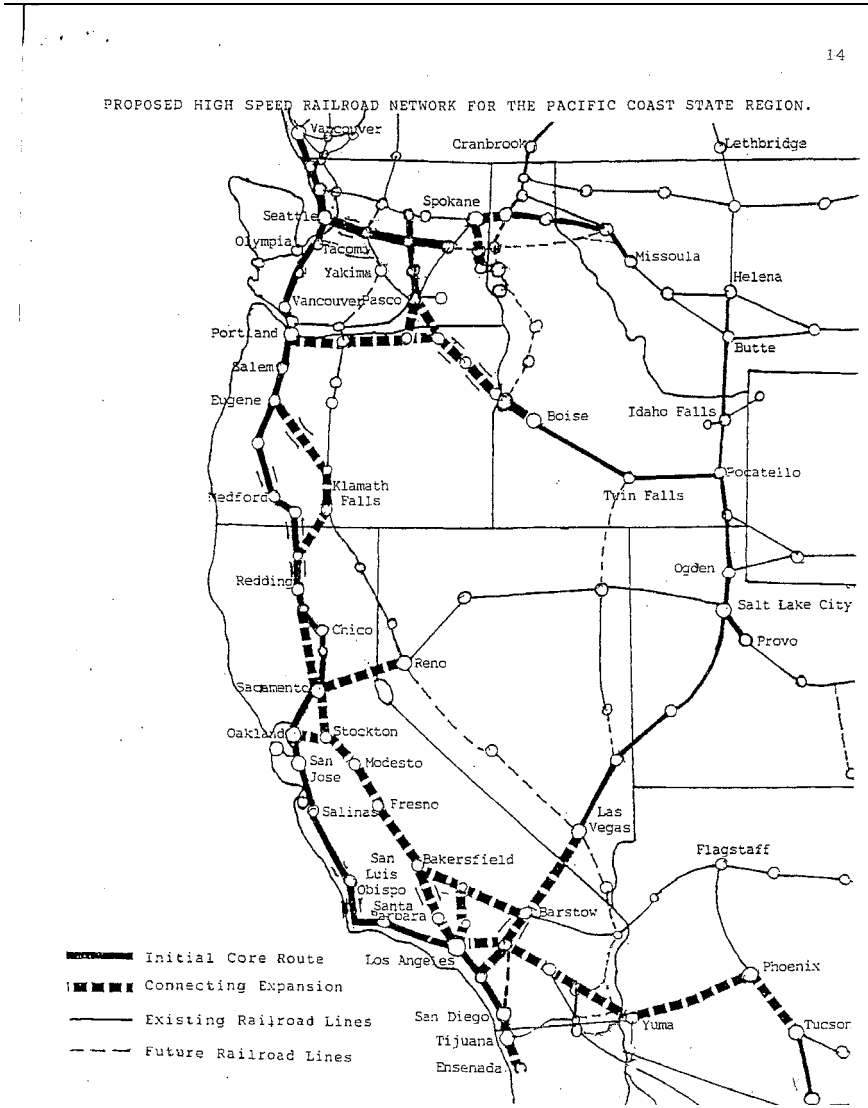
MAIN RAILROAD AND ROAD FEATURES ALONG THE ALAMEDA CORRIDOR ROUTE.

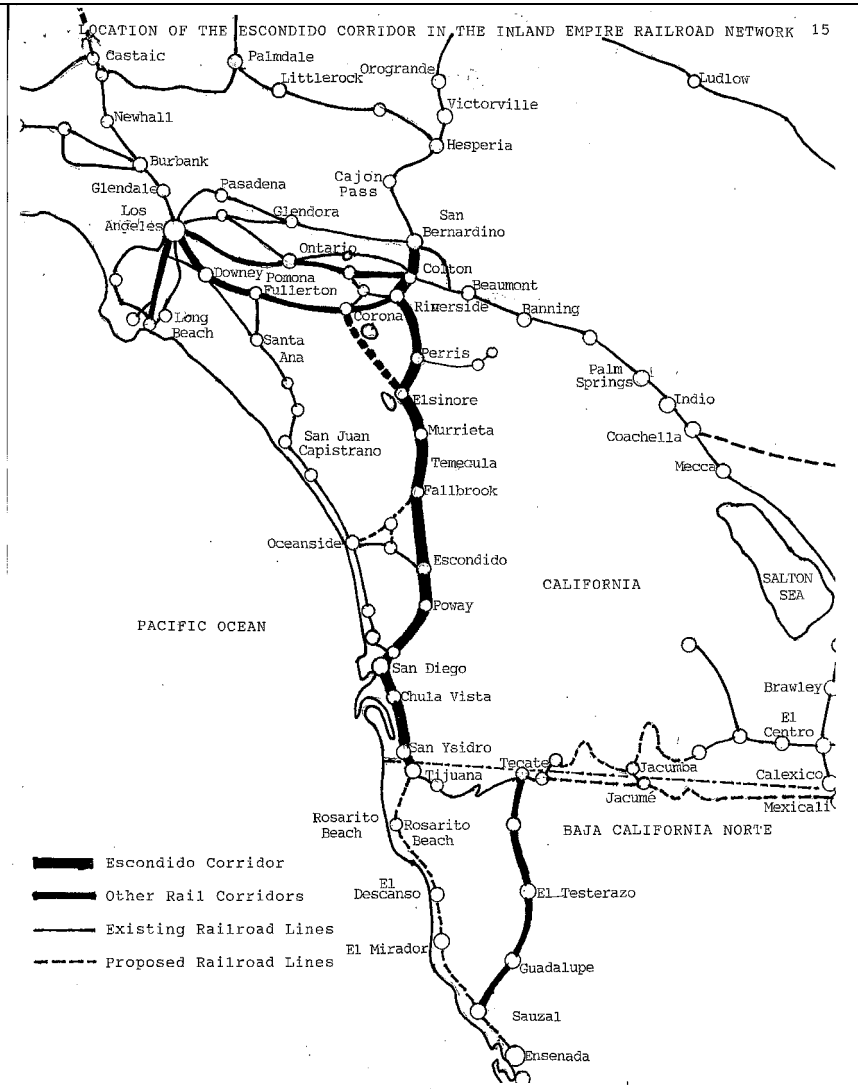



13



**Comment Letter PH-F031C Continued**



## Response to Comments Hal B. H. Cooper, Jr. , Oral Presentation, Attachment C, April 28, 2004 (Letter PH-F031C)

**PH-F031C-1**

This is an attachment to comment PH-F013. Please see response to Comment PH-F013-1.

## Comment Letter PH-F031D

**PH-F031D**
**Attachment D to**
**Oral Presentation**
**by**
**Hal B. H. Cooper, Jr.**
**4/28/04**
**Public Hearing**

It's 35 miles long, a mile deep, and meant to solve an entire nation's transportation woes. Strap on a pith helmet and dive in!

PHOTOS AND STORY BY ARMIN SCHMUTZ

# INSIDE THE WORLD'S LONGEST

The picture couldn't be more striking: A freight train claws for altitude up a series of loops and soaring bridges before vanishing into a summit tunnel flanked by peaks soaring 9,900 feet into the clouds. Next to it, thousands of trucks and autos queue interminably, waiting for room in their two-lane summit tunnel — or twist laboriously over a picturesque, two-lane road through a pass. This is a picture of a route in gridlock.

The route is the Gotthard Pass, 6,916 at its summit, and one of just four major routes across the Alps between industrialized northern and southern Europe. The Gotthard rail route, completed 122 years ago, uses a double-track tunnel 9.3 miles long, the longest tunnel in the world when it opened. The highway uses a 10.5-mile tunnel, also the longest of its type in the world when it opened in 1980.

Meanwhile, a third of a mile beneath the rail tunnel, miners are drilling through the same mountains, building a new 35.4-mile tunnel, which will be the new world's longest railway tunnel. When it and additional route

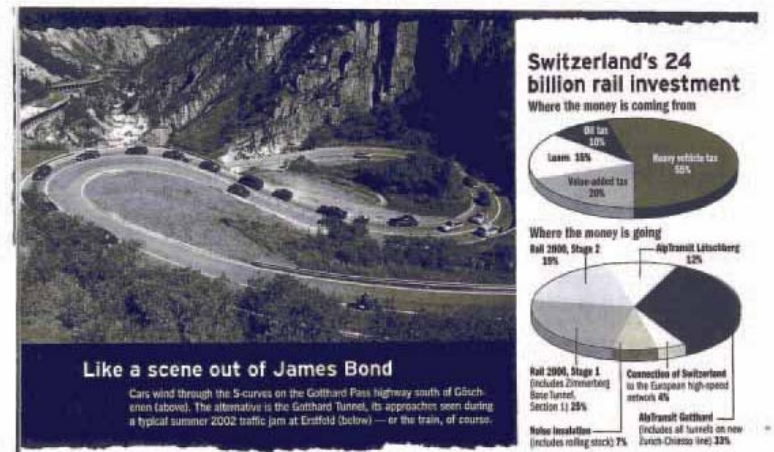
EIR-000089

# TUNNEL

A trainload of new trucks and vans rolls south through Switzerland's Gotthard Pass at Biasca, headed to Italy in May 2001.

EIR-000090

**Comment Letter PH-F031D Continued**



## Like a scene out of James Bond

Cars wind through the S-curves on the Gotthard Pass highway south of Göschenen (above). The alternative is the Gotthard Tunnel, its approaches seen during a typical summer 2002 traffic jam at Erstfeld (below) — or the train, of course.

## Switzerland's 24 billion rail investment

Where the money is coming from




Where the money is going




improvements are complete (scheduled for 2016), travel time by passenger train between Zurich, Switzerland, and Milan, Italy, 134 air-line miles apart, will be slashed from 220 to 130 minutes. Zurich is the railway hub of Switzerland, with through routes radiating to the ports and cities of Germany and the low countries, and through Paris and the Channel Tunnel to London. Milan is Italy's transportation and industrial hub.

This isn't about saving a few minutes: This is about a nation determined to banish most through trucks from its roads, and willing to spend $24 billion on railways to do it. By law, the 1.3 million trips trucks will take across the Swiss Alps this year must be cut in half by 2009. This is a nation that's looked at the congestion, noise, accidents, and pollution of trucks, and said, "That's it, we're doing rail." Switzerland is this serious about reducing truck traffic: it's written the reduction into its constitution.

### Gotthard: shortest but not easiest

Stretching from Nice, France, to Vienna, Austria, the Alps form a 600-mile connected whole separating northern and southern Europe. Though a difficult barrier, they have never been as impassable, as deep, trough-like valleys carved by glaciers lead from the plains to numerous passes. The Gotthard Pass — formally the *Stein* Gotthard Pass — long known as the shortest route between Zurich and Milan, was rarely used before the 13th century because its northern approach lies in the sheer-walled Schöllenen Gorge. In 218 B.C., the Carthaginian general Hannibal is reputed to have used Gotthard as a back door through which his army could fall on the Roman Empire. (Authorities now believe Hannibal's army, which after huge losses to cold, starvation, and disease arrived in Italy with 20,000 soldiers, 6,000 mounted knights, and, famously, 37 elephants, used the Mont Genevre, an easy and frequently traveled Roman pass considerably to the southeast between France and Italy.)

Gotthard Pass was indisputably a battleground on September 19–25, 1799, during the Napoleonic Wars, when a 21,000-man Russian-Cossack army led by Aleksandr Vasiliyevich Suvorov defeated a French army of 8,500 detailed to hold the pass. (Russian troops that fell in battle are commemorated with a large cross cut into the rock in the Schöllenen Gorge.) Suvorov's success was for nought: Two days later, a larger Russian army was defeated at Zurich. His army appeared trapped, but evaded defeat by slipping through the Panixer Pass. Suvorov lost 5,000 men to cold and hunger, and had to abandon his 25 artillery pieces, but by escaping with the bulk of his army intact earned the nickname, "the Russian Hannibal."

In the 1200s, the Schöllenen Gorge was conquered with a suspended wooden roadway along its sheer walls, crossing from one side to another on "the Devil's Bridge," so-called because it was said only a pact with the Devil

 vol 64, no 5, pp. 40–49

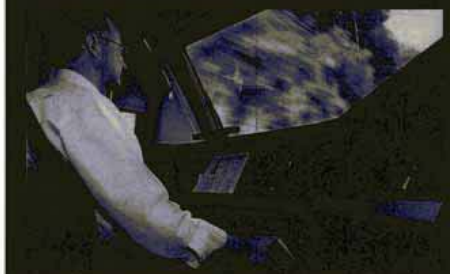
EIR-000091

## SWITZERLAND AT A GLANCE

### Freight crossing the Alps in 2001

| | SWITZERLAND million tons | % | AUSTRIA million tons | % | FRANCE million tons | % | TOTAL million tons | % |
|---|---|---|---|---|---|---|---|---|
| Rail | 22.8 | 67 | 17.3 | 28 | 10.4 | 19 | 50.5 | 33 |
| Highway | 11.4 | 33 | 45.3 | 72 | 43.8 | 81 | 100.5 | 67 |
| Total | 34.2 | 100 | 62.6 | 100 | 54.2 | 100 | 151.0 | 100 |

Source: Litra, Informationsdienst für den öffentlichen Verkehr, www.litra.ch



Engineer Karl Enz, in the cab of an Re 460 electric, takes an Intercity train over Gotthard.

Panoramic cars on SBB's Intercity trains let passengers take in the mountain scenery.

### Main trans-Alpine rail routes

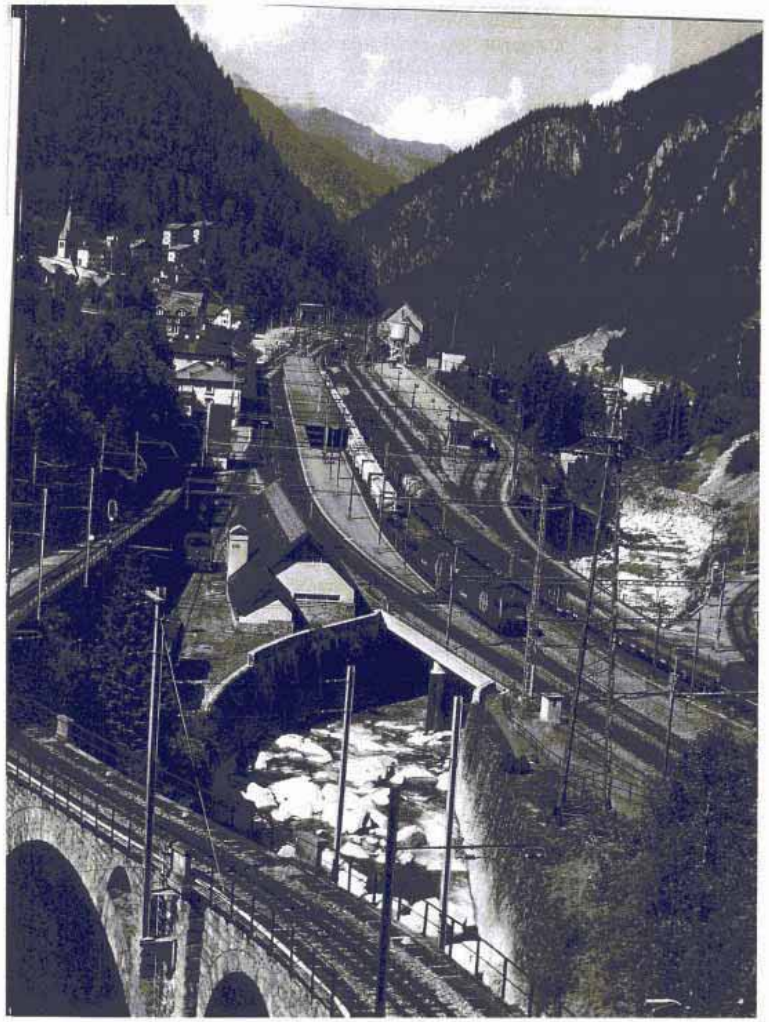

### Switzerland transportation

| | |
|---|---|
| **POPULATION** | |
| 2002 | 7.2 Million |
| **AVERAGE TRAIN JOURNEYS** | |
| Per year/person | 47 |
| Average distance | 26 miles |
| **RAIL NETWORK** | |
| Freight/passengers moved by rail in 2001 (ton-miles) | 4.4 million |
| Standard gauge | 2,269 miles |
| Narrow gauge | 859 miles |
| Not electrified | less than 12 miles |
| Railway stations | 1,842 |
| Number of Tunnels | 700 |
| Total mileage in tunnels | 245 |
| Bridges | 7,495 |
| Total mileage on bridges | 81 |
| Track owned by: | |
| Swiss Federal Rys. (SBB) | 1,868 miles |
| Bern-Lötschberg-Simplon | 152 miles |
| Other track owners | 49 private railways |
| **HIGHWAYS** | |
| Total length | 44,118 miles |
| Autobahn 6 lanes | 50 miles |
| Autobahn 4 lanes | 738 miles |
| Autobahn 2 lanes | 174 miles |
| Freight/passengers moved in 2001 (ton-miles) | 14.1 million |
| Truck trips in Switzerland: | |
| Over Swiss Alps in 2003 | 1.29 million |

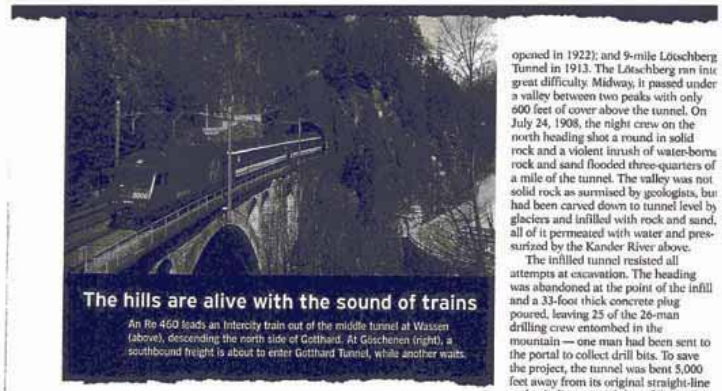
Source: BAV, Bundesamt für Verkehr, www.bav.admin.ch

EIR-000092

**Comment Letter PH-F031D Continued**



EIR-000093



## The hills are alive with the sound of trains

An Re 460 leads an Intercity train out of the middle tunnel at Wassen (above), descending the north side of Gotthard. At Göschenen (right), a southbound freight is about to enter Gotthard Tunnel, while another waits.

would permit such a flimsy structure to actually work. This enabled a mule path to be constructed over the pass. A hospice to shelter travelers was constructed at the summit at the same time (but was destroyed by French soldiers in 1799 to deny it to Suvorov's troops). Regular mail service using pack horses began in 1696, and in 1830 the completion of a wagon road permitted regular travel, at least during the summer.

Not long after Switzerland's first railroad opened in 1847, Alpine crossings were contemplated. Gotthard Pass was surveyed in 1861, but its difficulties led to other passes being crossed first by rail: Semmering in 1854; Brenner in 1867; and Mont (or Mount) Cenis in 1868. Heavy snowfall, avalanches, and steep grades all militated for the construction of tunnels beneath the passes. The 8.3-mile Mont Cenis Tunnel, also known as the Fréjus Tunnel for the mountain under which it passes, was the first very long tunnel in the world. It was completed in 1871 after 14 years of work and heavy fatalities.

In 1871, the Swiss, Italian, and German governments agreed to partially fund the 56-mile Gotthard Railway. Centerpiece of the line was the 9.3-mile Gotthard Tunnel, whose apex is at 3,777 feet in elevation. Construction crews began excavating from the north and south portals simultaneously in August 1872, but the work was more difficult than anyone imagined. Expecting to find solid rock that would be self-supporting until a masonry lining was erected, the miners instead encountered water under extreme pressure, both cold and hot, that shot in jets from drill holes and through fissures and flooded the tunnel. Shear zones seemingly placed the entire weight of the mountain onto the temporary timber lining and crushed it; a forest's worth of oak and fir disappeared inside. Temperatures inside climbed above 100 degrees, and inadequate ventilation left miners choking on rock dust and poisonous dynamite fumes. At least 199 miners died in accidents; thousands more were permanently debilitated by maiming injuries and silicosis. Even the contractor, Louis Favre, died of a heart attack inside Gotthard, his family reduced to poverty by delay penalties when the fantastically optimistic construction scheduled couldn't be kept.

Regardless, work continued. The pilot headings met on February 29, 1880, with a deviation of just 13 inches. After the tunnel was broken out to full size and permanently lined, it opened to traffic on June 1, 1882, completing a 169-mile route from Basel to Milan. Five spiral tunnels, two switchback tunnels, and extensive loops on each approach were still essential to reduce approach grades to a stiff 2.8%!

Other major Alpine tunnels followed: 6.4-mile Arlberg Tunnel in 1884, forming the major east-west route between Austria and Switzerland; 12.3-mile Simplon in 1906, linking Switzerland and Italy and eclipsing Gotthard as world's longest (a second, parallel tunnel opened in 1922); and 9-mile Lötschberg Tunnel in 1913. The Lötschberg ran into great difficulty. Midway, it passed under a valley between two peaks with only 600 feet of cover above the tunnel. On July 24, 1908, the night crew on the north heading shot a round in solid rock and a violent inrush of water-borne rock and sand flooded three-quarters of a mile of the tunnel. The valley was not solid rock as surmised by geologists, but had been carved down to tunnel level by glaciers and infilled with rock and sand, all of it permeated with water and pressurized by the Kander River above.

The infilled tunnel resisted all attempts at excavation. The heading was abandoned at the point of the infill and a 33-foot thick concrete plug poured, leaving 25 of the 26-man drilling crew entombed in the mountain — one man had been sent to the portal to collect drill bits. To save the project, the tunnel was bent 5,000 feet away from its original straight-line path, circling around the infilled valley. That north and south headings met successfully after incorporating three curves testified to the skill of the surveyors, if not the geologists who had signed off on the original route.

### Taxing trucks to build railways

Switzerland is landlocked, small, meager in raw materials, and 60% of its area is occupied by the Alps — only 10% is arable. Since its founding in 1291, it has understood that economic success lies in its location between Europe's industrial and agricultural giants, and has encouraged transportation and trade. Private companies financed railway construction in the late 1800s, but as rail became indispensable, the government bought up the largest railroads to secure its lines of communication. The Swiss Federal Railways (or SBB, short for Schweizerische Bundesbahnen) was formed on January 1, 1902.

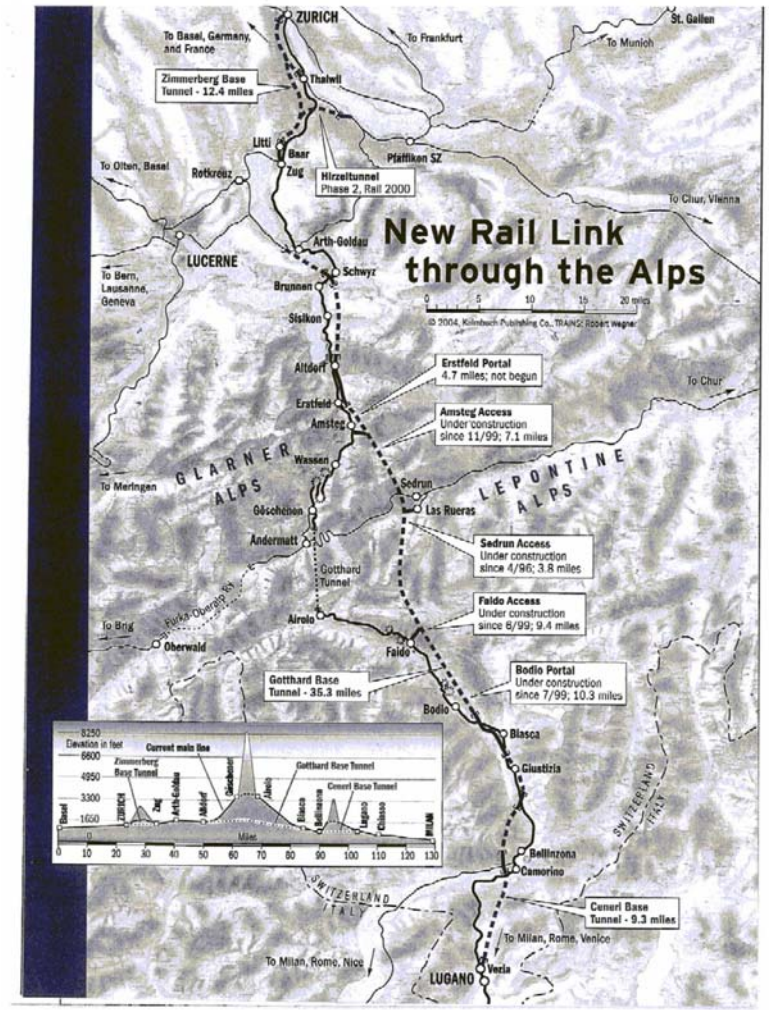
Like most countries, Switzerland became enamored with highways after World War II. In the early 1960s, it began building a highway network totaling nearly 1,000 miles, in a country a little less than the size of Vermont and New Hampshire combined. Though investment in rail continued, twice as much money was poured into roads. From 1950–2001, rail's share of freight traffic shrank from 70% to 30%, while the highway share grew from 29% to 65%. Freight crossing the Alps grew fivefold in the same period, reaching 151 million tons (U.S.) in 2001.

Trucks now consume one-third of Switzerland's highway capacity, and the



EIR-000094

**Comment Letter PH-F031D Continued**




EIR-000095

New Rail Link Through the Alps. NEAT will connect Zurich and the Italian border town of Chiasso, 32 miles from Milan. Three long tunnels and new connecting routes will give NEAT a nearly level profile: The 12.4-mile Zimmerberg Base is scheduled for completion in 2013; the 35.3-mile Gotthard Base is scheduled to open in 2013–14; and the 9.3-mile Ceneri Base is scheduled to open in 2016. Swiss Federal Railways is managing the construction of NEAT through subsidiary AlpTransit Gotthard. The Lötschberg Base Tunnel is being built under a similar arrangement by BLS AlpTransit Lötschberg, a subsidiary of BLS Lötschbergbahn, the private Swiss railroad that owns the Lötschberg Tunnel route.

Conceptual designs of the Gotthard Base Tunnel considered a double-track tunnel as the most economical to construct. That was tossed out in favor of two parallel single-track bores, to obtain safety from collisions, higher traffic capacity, and improved escape routes for passengers and railway employees in case of fire. About 180 cross-passages, spaced every 1,066 feet, will serve during construction as access routes and upon completion as emergency escape routes. Two multi-function stations within the tunnel will provide emergency stopping points for trains and access shafts for maintenance, ventilation, and evacuation. Crossovers between the tunnels (at the stations) will enable maintenance work to proceed in tunnel sections without closing the entire tunnel, as would be the case in a single double-track bore. Trains entering the south portal will encounter the first station at Faido, 10 miles in, and the second at Sedrun, 20 miles in, where two elevator shafts connect the railroad tunnels with access tunnels to the surface a half-mile above. At Amsteg, 30 miles in and five miles from the north portal, horizontal access tunnels provide a third intermediate escape route.

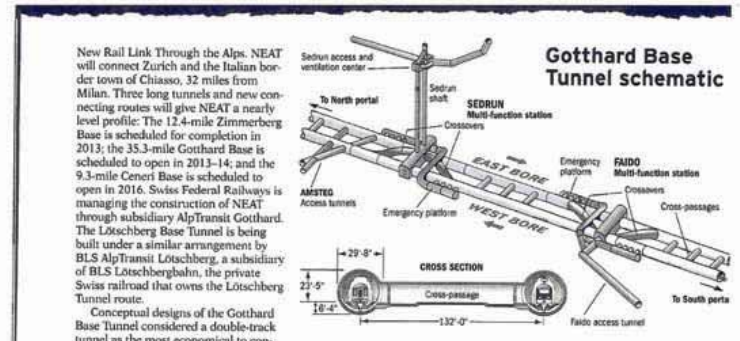
Unlike 19th century tunnels, whose rock conditions were projected on the basis of what could be seen from the surface, core drilling was used to obtain detailed geologic profiles of the proposed route, and four exploration shafts were sunk near Faido in 1993 to verify conditions that would be encountered in the actual tunnel. That information resulted in geologists recommending a gently S-curved tunnel 35.3 miles long instead of a straight tunnel of 28 miles, which, though longer, will keep the bores within hard rock formations of granite and gneiss as much as possible, and skirt soft sedimentary formations, which cannot provide self-supporting roofs.

The most serious geologic problem in the Alps is fault zones, which in the Gotthard massif are encountered every 113 feet, on average. Crumbled rock bordering each fault can exert tremendous pressure on a tunnel. Worse, about one in six is saturated with groundwater. At these depths, groundwater is standing under a head of several thousand feet, and water flows of 1,500 to 15,000 gallons per minute are common. Entering a fault zone is like drilling up from beneath the ocean and expecting to plug the hole. Draining the water is not a good solution, as it usually drains the local water table, drying up wells and springs, and causing widespread surface subsidence.

Thus, no single mining technique is economical for the entire project. In hard rock, tunnel boring machines (TBMs) drive the tunnel full-face; their daily production rate is as much as 70 feet. TBMs are expected to bore 26.3 of the 35 miles. In soft rock, which jam the drilling teeth of a TBM, tunneling contractors use traditional drill-and-blast techniques, with drills mounted on robot-like hydraulically positioned arms of a self-propelled machine called a drilling jumbo, and advances of 20–30 feet a day are considered good. Soft sections generally require rock bolting to support the roof, and heavy steel "arch" sets in areas of severe pressure, and a shotcrete lining (a sprayable mixture of cement, sand, and water) to control spalling. Excavated rock is removed on conveyor belts and mining railways.

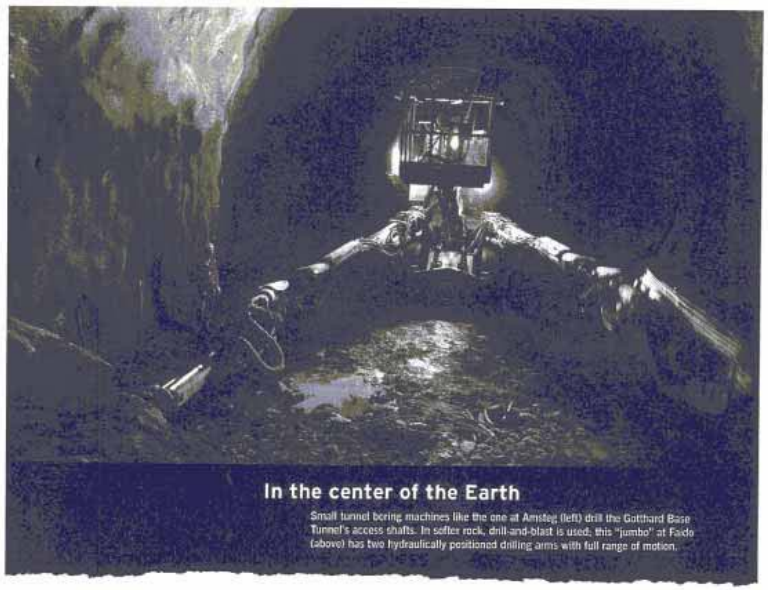
In all, 95 miles of shafts, galleries, and tunnels will be dug, removing 27.5 million tons of rock, enough to build five of the Great Egyptian pyramids. About 20% of the rock will go back into the tunnel as aggregate in the concrete lining, track pan, or other construction. Another 25% will be used as landfill, and about half will be sold as construction material.

To shorten construction time, crews are working at five headings. Ground was broken on April 15, 1996, at Sedrun. For the next three years, work was limited to excavating Sedrun's access tunnel and elevator shaft. In 1999, construction began at the south portal and the two other intermediate




EIR-000096

**Comment Letter PH-F031D Continued**



**In the center of the Earth**

Small tunnel boring machines like the one at Amsteg (left) drill the Gotthard Base Tunnel's access shafts. In softer rock, drill-and-blast is used; this "jumbo" at Faido (above) has two hydraulically positioned drilling arms with full range of motion.

points. Still, it wasn't until 2003 that miners began boring the actual rail tunnels. As of February 2004, with 1,500 to 1,800 people working 24 hours a day on three shifts, 21% of the excavation is complete, mostly access tunnels and passageways in the multi-function stations. The railway is still negotiating with villages at the north portal on a final alignment, and has yet to begin that entrance.

After the miners are done, much work will remain. Within the tunnel, each track will rest on a reinforced, cast-in-place concrete pad 12 inches thick. Track material will consume 190,000 concrete ties, 141 miles of rail, and 1,736 miles of cable for power, signal, and data transmission.

At its deepest, the tunnel is nearly 1.5 miles below the surface, where temperatures can climb as high as 113 degrees. Traffic conditions inside the tunnel are expected to be 95 degrees. Moving trains will push fresh air through the bores, with 441 square feet of each bore's cross section remaining open to minimize air-pressure resistance. Pressurized rolling stock will be required for passenger trains. Passenger-train speeds through the Gotthard Base Tunnel will range between 124 and 155 mph — a 20-minute trip — while fast freights will run at 99 mph. Some trains are expected to continue using the original Gotthard route, although no official plans have been released.

### A matter of national will

SBB isn't waiting for the new base tunnel to increase capacity over Gotthard Pass. This year, it is phasing in a new operating system, code-named "ski lift," under which freight trains depart at fixed times rather than waiting to fill to tonnage. This will place a freight train across Gotthard Pass every 10–15 minutes during daylight hours, and at night — the peak period for freight — every five minutes. While actual frequencies vary throughout the week, the system should increase daily freight train capacity from the present 150–170 to about 190. Since December 2003, private railroad BLS Cargo has been operating its own intermodal trains over Gotthard between Germany and Italy, which now number up to 70 trains a week, quite a revolution.

Much work remains before Switzerland's shift from road to rail takes place. Its plan is expensive and technologically demanding. But the essential element is political will, the will to tax truckers and spend money on rail, both private- and government-owned. Switzerland intends to prove that rail, not highways, is the best way to provide economic success *and* a high standard of living. ■

*ARMIN SCHMUTZ, a frequent contributor to German and Swiss rail magazines since 1996, and a member of the Swiss Public Transport Journalists, won our photo-of-the-year contest in January 2003.*



EIR-000097

## Response to Comments Hal B. H. Cooper, Jr., Oral Presentation, Attachment D, April 28, 2004 (Letter PH-F031D)

**PH-F031D-1**

This is an attachment to comment PH-F013. Please see response to Comment PH-F013-1.

## Comment Letter PH-F032

PH-F032

**PUBLIC HEARING ON CALIFORNIA HIGH-SPEED TRAIN DRAFT PROGRAM EIR/EIS**

FLYCALIFORNIA
Without ever leaving the ground.

Sacramento, March 23, 2004☐
Los Angeles, April 13, 2004☐
San Francisco, April 15, 2004☐
San Diego, April 20, 2004☐
Fresno, April 28, 2004☒

**COMMENT SHEET**

Written comments may be submitted at today's meeting or be mailed or faxed to the Authority.

Mail: California High-Speed Train
Draft Program EIR/EIS Comments
925 L Street, Sacramento, CA 95814

Fax: (916) 322-0827
Attn: California High-Speed Train
Draft Program EIR/EIS Comments

Comments may also be submitted through the Authority's Web site: www.cahighspeedrail.ca.gov.

All comments must be received by end of day **August 31, 2004.**

Name: Dennis Mills
Affiliation (if applicable): Tulare County
Address: 5961 S. Mooney Blvd.
City, State, Zip: Visalia, CA 93277
Phone #: 559-733-6291
E-mail: dmills@co.tulare.ca.us

Please provide your comments below on the project's draft environmental document:

CHSR should link to other transportation modes and not overlap. Why build in SF if there are exsisting rail/transit lines? What travel time assemptions did you use for the auto option. I think you should stress the noise of the HSR more Did you address the additional traffic the HSR will produce within the smaller communities/cities. PH-F032-1 PH-F032-2 PH-F032-3

Thank you for your comments. If needed, please continue on reverse.

## Response to Comments Dennis Mills, Tulare County, April 28, 2004 (Letter PH-F032)

### PH-F032-1

Acknowledged. While the Authority agrees that the HST system must link to other modes of transportation, in order to offer a competitive mode of transportation, the HST must "overlap" to some extent with local and regional commuter services and provide direct service to major metropolitan areas. Studies (CRA technical reports, and studies for other HST proposals) indicate that HST ridership potential is highly dependent on the total trip time and the number of transfers. The HST service would result in travel times between Downtown Los Angeles and Downtown San Francisco of about 2 hours 35 minutes, without a transfer. The HST trip between San Francisco (Transbay Terminal) and San Jose (Diridon Station) would be as little as 30 minutes, whereas the current Caltrain service takes 58 to 96 minutes between San Francisco (4th and King) and San Jose (Diridon Station). Of the 43 daily Caltrain trains (in each direction) only some are express ("baby bullet") trains providing the quickest travel times (58 minutes), whereas many of the trains are local service with travel times about 96 minutes. HST service to the downtowns of major cities, such as San Francisco, would greatly increase the connectivity and accessibility of the HST system, and would enable the system to directly serve major regional transit hubs such as the Transbay Terminal.

Please see Section 3.2 (including Table 3.2-5) of the Program EIR/EIS for automobile travel time assumptions.

### PH-F032-2

Acknowledged. The Authority believes that the potential for noise impacts of the HST Alternative is adequately addressed in the Program EIR/EIS (please see Section 3.4), and will receive further analysis in project level documents, should a decision be made to move forward with the proposed HST system.

### PH-F032-3

Yes, please see Section 3.1.

## Comment Letter PH-F033

PH-F033

PUBLIC HEARING ON CALIFORNIA HIGH-SPEED TRAIN DRAFT PROGRAM EIR/EIS

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Sacramento, March 23, 2004☐
Los Angeles, April 13, 2004☐
San Francisco, April 15, 2004☐
San Diego, April 20, 2004☐
Fresno, April 28, 2004☒

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Draft Program EIR/EIS Comments
925 L Street, Sacramento, CA 95814

Fax: (916) 322-0827
Attn: California High-Speed Train
Draft Program EIR/EIS Comments

Comments may also be submitted through the Authority's Web site: www.cahighspeedrail.ca.gov.

All comments must be received by end of day **August 31, 2004.**

Name: Georgiean Peters

Affiliation (if applicable):

Address: 1324 W San Jose

City, State, Zip: Fresno, Calif. 93711

Phone #:

E-mail: TPe4876339@aol.com

Please provide your comments below on the project's draft environmental document:

I am in favor of high speed rail. Merced might be a good spot for maintenance station. Prefer major passenger stop for Fresno due to populations. PH-F033-1

Please keep bond measure on ballot for 2006. I doubt if it would pass in 2004 due to states budget woes. Do not delay till 2008 by then all environmental + other studies need to be redone. PH-F033-2

Please keep me informed. Let me know if needed to promote bond measure. PH-F033-3

CALIFORNIA HIGH-SPEED RAIL AUTHORITY
U.S. Department of Transportation Federal Railroad Administration

Thank you for your comments. If needed, please continue on reverse.

## Response to Comments Georgiean Peters, May 10, 2004 (Letter PH-F033)

**PHF033-1**

Acknowledged.

**PHF033-2**

Please see standard response 2.35.1.

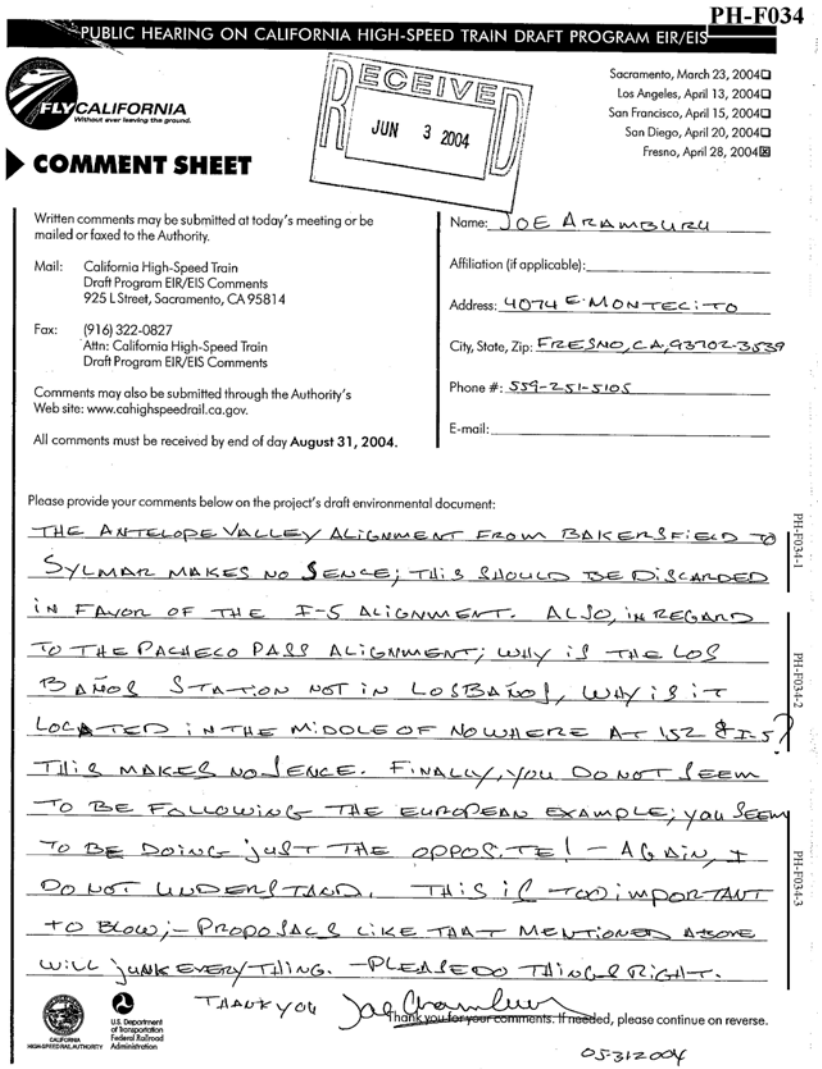
**PHF033-3**

Please see standard response 6.20.1.

**PHF033-4**

Acknowledged. The referenced "bond measure" is not part of this program environmental process.

## Comment Letter PH-F034



PH-F034

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San Francisco, April 15, 2004 ☐
San Diego, April 20, 2004 ☐
Fresno, April 28, 2004 ☒

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Comments may also be submitted through the Authority's Web site: www.cahighspeedrail.ca.gov.

All comments must be received by end of day **August 31, 2004.**

Name: JOE ARAMBURU
Affiliation (if applicable):
Address: 4074 E MONTECITO
City, State, Zip: FRESNO, CA, 93702-3539
Phone #: 559-251-5105
E-mail:

Please provide your comments below on the project's draft environmental document:

THE ANTELOPE VALLEY ALIGNMENT FROM BAKERSFIELD TO SYLMAR MAKES NO SENCE; THIS SHOULD BE DISCARDED IN FAVOR OF THE I-5 ALIGNMENT. ALSO, IN REGARD TO THE PACHECO PASS ALIGNMENT; WHY IS THE LOS BAÑOS STATION NOT IN LOS BAÑOS, WHY IS IT LOCATED IN THE MIDDLE OF NOWHERE AT 152 & I-5? THIS MAKES NO SENCE. FINALLY, YOU DO NOT SEEM TO BE FOLLOWING THE EUROPEAN EXAMPLE; YOU SEEM TO BE DOING JUST THE OPPOSITE! - AGAIN, I DO NOT UNDERSTAND. THIS IS TOO IMPORTANT TO BLOW; - PROPOSALS LIKE THAT MENTIONED ABOVE WILL JUNK EVERYTHING. - PLEASE DO THINGS RIGHT.

PH-F034-1
PH-F034-2
PH-F034-3

THANK YOU Joe Aramburu

Thank you for your comments. If needed, please continue on reverse.

05-31-2004

CALIFORNIA HIGH-SPEED RAIL AUTHORITY
U.S. Department of Transportation Federal Railroad Administration

## Response to Comments Joe Aramburu, June 3, 2004 (Letter PH-F034)

### PH-F034-1

Please see standard response 6.23.1.

### PH-F034-2

Please see standard response 6.11.1.

### PH-F034-3

Acknowledged. The Authority disagrees with your assessment. The Authority's Business Plan was favorably peer reviewed by SNCF, Japan Railways Technical Services, and DE Consult. Moreover, the consultants hired to conduct the technical evaluations have considerable experience in the implementation of HST systems worldwide.